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## SYNOPSIS OF THE ANTHOPHILAX OF NORTH AMERICA (COL.).

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After taking several beautiful green specimens of this genus while collecting in Maine during the month of May, 1916, I became greatly interested in the species of this group. While comparing specimens with descriptions and all available material, I found the greatest confusion existed in separating our forms. So at the suggestion of Mr. Charles W. Leng, who has ever been ready with advice and kind offers of assistance, I decided to revise the group including all the new forms.

Without the help and complete records of Dr. Edwin C. Van Dyke, I am afraid our western species would still be in considerable confusion, but he very kindly came to the rescue, not only revising my key but also adding a new species, our eighth, to the genus.

Through the kindness of Mr. Andrew J. Mutchler by permission of Dr. Frank E. Lutz I have been able to examine the material in the American Museum of Natural History. Mr. Charles Schaeffer allowed me to inspect specimens in the collection of the Brooklyn Museum. I also have to thank Messrs. William T. Davis, W. S. Fisher and Ernest Shoemaker for records and loan of material.

All the species inhabit mountainous districts preferably the higher altitudes and are quite rare in collections.

The genus *Anthophilax* was erected in 1850 by Le Conte<sup>1</sup> to separate those forms having dilated labial palpi, head constricted behind eyes, eleven jointed antennæ inserted between the eyes, which are emarginate; thorax with rectangular hind angles moderately constricted on each side and acutely tuberculate at sides.

### TABLE OF THE SPECIES OF ANTHOPHILAX LEC.

- |  |   |
|--|---|
| 1. Third joint of antennæ long, as long or longer than the first and distinctly longer than fourth .....                 | 2 |
| Third joint of antennæ relatively short, shorter than the first and equal to or but slightly longer than the fourth..... | 5 |

<sup>1</sup> Agassiz and Cabot, "Lake Superior," 1850, p. 236.

2. Elytra metallic green or bronzed.....3  
Elytra testaceous, irregularly maculate with piceous spots and adorned with irregular tufts of white pubescence... **attenuatus** Hald.
3. Legs in great part piceous or black.....4  
Legs in great part reddish or yellowish, head and prothorax metallic green or bronzed.....**malachiticus** Hald.
4. Prothorax black, slightly brassy, moderately finely and discretely punctured, no ante-basal transverse ridge.....**viridis** Lec.  
Prothorax bronzed black, deeply and confluent punctured, scabrous, ante-basal transverse ridge more or less distinctly marked....**hoffmanni** Beut.
5. Elytra as well as rest of body wholly black.....6  
Elytra bicolored or wholly pale.....7
6. Elytra moderately densely punctured, grossly towards base and finer toward apex; third antennal joint longer than fourth....♂ and ♀ **tenebrosus** Lec.  
Elytra coarsely punctate or scabrous in basal half and shining, abruptly smoother and opaque at apical half; third antennal joint of equal length to fourth .....♀ **mirificus** Lec.
7. Legs wholly black .....8  
Legs and antennæ piceo-testaceous; elytra luteo-testaceous with feebly marked black, common sutural and narrow, submarginal vittæ.  
(?) ♂ **subvittatus** Casey.
8. Elytra dull velvety red with scutellar area and subapical spot or area black.  
♂ **mirificus** Bland.  
Elytra yellow with three deep black vittæ, a common sutural and one on each side, which extends from humerus to apex and unites with the sutural.....♂ **nigrolineatus** Van Dyke.

#### **A. attenuatus** (Haldeman).

*Stenura attenuata* Hald., Trans. Am. Philos. Soc. Phil., 1847, p. 59.

Head large, feebly channeled, thorax a little broader, channeled, disk longitudinally elevated on each side and with an acute lateral tubercle, labial palpi with last joint elongate, triangular, black, punctate, densely grayish pubescent. Elytra mamorate with testaceous, unequally pubescent apex straightly truncate. Male much more slender than female, antennæ entirely black, lateral outline of elytra concave. Female antennæ annulate, almost entirely brownish red except apical joints piceous. Length 13-17 mm.

Eagle Harbor, Mich. (Le Conte), Marquette, Mich., June 28, common in wash up (Sherman), Douglas Hill, Cumberland Co., Me., May-June (Nicolay), Catskill Mts. (Pearsall), Top Whiteface Mt., N. Y., July 8 (Davis & Shoemaker), Franconia, N. H. (Slosson), New Brunswick, Duluth, Minn. (Leng), Virginia.

This species is the most common and generally distributed of the genus. It has been taken abundantly by Le Conte and Sherman in wash up on shore of Lake Superior. Quite local, but not rare where

it occurs, most specimens were taken flying. I beat one female from the half dead pine needles where I took *malachiticus*.

**A. malachiticus** (Haldeman).

*Stenura malachitica* Hald., Trans. Am. Phil. Soc., New series, 1845, p. 64.

*Stenura cyanea* Hald., Proc. Acad. Nat. Sci. Philad., 1847, Vol. III, p. 151.

*Pachyta leonardi* Harris Mss.

Head and thorax green or bronzed, punctures coarser than in *viridis*, but not so much so as in *hoffmanii*, apex of antennæ reddish, elytra splendid green, sometimes bronzed, scabrous, with dilated, impressed punctures, scutellum black, trophi and feet testaceous, tarsi and outer half of tibiæ brown, prothorax with a lateral tubercle. Male body decidedly wedge shaped, antennæ black except with touch of red at basal joints, female body more oblong, antennæ annulate. Length 12-16 mm.

Jackson, N. H., June 5 (E. D. Harris), Hampton, N. H., June 13 (Shaw), Marquette, Mich., June 28, in wash up (Sherman) Cumberland Co., Maine (near Douglas Hill), May 18-June 14 (Nicolay), Rock City, Cattaraugus Co., N. Y., June 7 (W. T. Davis), Fort Montgomery, June 14, beating blossoms (Schott), June 30 (H. G. Barber), Somerset County, Pa.

Although rare this is the green species most generally taken. My specimens were beaten from half dead pine needles, from off the tops of trees felled the previous winter. I never took a specimen from a completely dead or dried up cluster of needles, nor from a live and healthy tree. By beating branches all morning I would be lucky in securing one specimen. Besides differing from *viridis* in color of the legs, the very great contrast both in color and punctuation of thorax ought to dispense for all time with the thought that they are the same species.

**A. viridis** Leconte.

*A. viridis* Lec., Agass. L. Sup., 1850, p. 236.

Black, head and thorax brassy, discretely and not deeply punctured, gray-pubescent, the latter narrowed in front, constricted on each side, with a shallow channel, spined (not very acutely) at the sides, elytra with large confluent punctures, substriate, splendid green-bronzed, rounded at apex, apex of antennæ and base of tibiæ reddish. Male body decidedly wedge-shaped, antennæ black, except with slight touch of red at basal joints, female body more oblong, antennæ distinctly annulate. Length 13-16 mm.

The description is copied from Le Conte's with a few changes. The specimens I have seen have the head and thorax black and slightly brassy, not virescent as Le Conte said. The species also pos-

sesses striking sexual characteristics, the female being readily told from male by annulate antennæ, and less wedge shaped body.

This longicorn is extremely rare and very local, evidently preferring the highest peaks of mountain ranges. Mr. Ernest Shoemaker is the only local collector fortunate enough to take the species, capturing one male on top of Whiteface Mt., Adirondack Range, N. Y., July 13, and one beautiful green female taken on blackberry blossoms at Slide Mt., Catskill Range, N. Y., July 4. Other records are Marquette, Mich., June 28, in wash up on shore of L. Superior (Sherman), Eagle Harbor, Mich. (Le Conte), Mt. Graybeard, N. C., July, on rhododendron flowers (Van Dyke).

**A. hoffmani** Beutenmüller.

*A. hoffmani* Beut., Bull. Am. Museum, Vol. XIX, pp. 518-519, 1903.

Head and thorax bronzed black, deeply and confluent punctured. Head with a median sulcus in front, carinate on each side from below the antennæ to mandibles. Thorax scabrous, with antebasal transverse ridge, narrower in front than behind, a median depression on the anterior half, anterior portion somewhat constricted, hind angles rather prominent, produced by the lateral depression, on each side at the middle is a prominent spine-like protuberance. Antennæ black, elytra bright shining green, red laterally, rugosely reticulated; humeri prominent; scutellum black. Underside black or brassy black with very short whitish hairs, finely rugose. Legs brassy black, pubescent; tibiæ somewhat rufous basally. Male antennæ as long as body; female antennæ reach to one third from tip of elytra, hind angles of thorax more produced, the lateral protuberances longer and more pointed and body more robust than in the male. Length ♂, 13-15 mm., ♀, 18-20 mm.

Summits of the Black Mts., western North Carolina, June 26-July 11.

Ten specimens of this most beautiful *Anthophilax* were taken by Mr. Beutenmüller and Dr. Van Dyke on the balsam fir (*Abies frazeri*), one female being found ovipositing in same.

I have had the privilege of examining types in the American Museum and am fully convinced it is distinct. The characteristics given in the key make its separation easy. Also, as Dr. Van Dyke points out, it can not be regarded as a geographical variety of *viridis*, the species it most nearly approaches and of which a specimen was taken in the same locality only three miles away.

**A. tenebrosus** Leconte.

*A. tenebrosus* Lec., S. M. C., No. 264, 1873, p. 208.

Black, head and thorax closely, but feebly punctate, thorax moderately constricted in front and behind, with a short obtuse lateral tubercle. Elytra

moderately densely punctured, grossly toward base and finer toward apex, more shining at base than at apex. Third antennal joint longer than fourth. Eyes subtriangular, strongly and broadly emarginate at the antero-interior side. Length 12 mm.

Lake Tahoe Region, June 22–July 15, Yosemite Region, Tuolumne Meadows, August 2, Southern Sierras, Monarch Lake, Tulare Co., July 10, Cal. (Van Dyke), S. E. Cal. (Horn).

Dr. Van Dyke says "this is a high altitude species, generally found from 7,000 to 11,000 feet and usually about fir in which it probably breeds. I think that it ranges throughout the High Sierras and perhaps also in Oregon, though I have not seen any specimens from the Cascades." Dr. Van Dyke has taken somewhat over eight specimens, the males and females occurring in about equal numbers. From comparison made between one of these and *mirificus*, *tenebrosus* appears to be a narrower insect.

#### A. *mirificus* Bland.

*A. mirificus* Bland, Proc. Ent. Soc. Phil., 1865, p. 382.

*A. venustus* Bland, Proc. Ent. Soc. Phil., 1865, p. 383 (female).

Male.—Head and thorax black, coarsely punctured; head deeply impressed between the antennæ, surface of the thorax uneven, a deep dilated central line and deep transverse lines near the anterior and basal margins, lateral margins nearly straight, with a strong obtuse tubercle. Elytra dull velvety red with scutellar area and subapical spot black, basal half deeply but sparsely punctured, becoming less distinct on apical half. Beneath minutely punctured, segments rufous. Antennæ nearly length of body, third and fourth joints equal, basal joints shining. Palpi rufous, mandibles rufous at middle. Scutellum triangular, closely punctured. Legs black. Length 14 mm.

Female.—Entirely black, clothed with short, erect, brownish hairs. Head grossly punctured, somewhat shining, central line deeply impressed between the antennæ, becoming obsolete near the base, a broad transverse depression back of the eyes. Antennæ about one half the length of the body, third and fourth joints equal, fifth as long as the third and fourth combined. Palpi piceous, mouth furnished with dark brown hairs. Thorax uneven, grossly punctured, opaque, a deep transverse line near the anterior and posterior margins, central longitudinal line dilated; a strong, obtuse, polished tubercle on the side. Scutellum triangular, closely punctured; humeri prominent, lateral margins parallel to the rounding of the tip, posterior half opaque, minutely rugose, dorsal surface flattened, sides gradually depressed. Beneath black, shining, closely and neatly punctured. Length 19 mm.

Kamas, Utah, June 5–21; Buford, Colorado, July 27; Columbia Falls, Montana, June 7; Haines, Oregon, August 3; Centerville, Idaho,

June; Yreka, California (Forest Insect Coll. in U. S. National Museum), Boise, Idaho, June 30 (Nicolay collection).

Because of the striking difference in appearance of the sexes, the female was described by Bland in the same paper with *mirificus* under the name *venustus*. Also because of the great scarcity of material considerable confusion existed in separating not only the female from specimens of *tenebrosus*, but even as regarded certain characteristics attributed to the male. In every male specimen examined the basal half of the elytra is deeply but sparsely punctured, becoming less distinct on the apical half. I can not quite understand what Horn had in mind when he wrote "impunctate" in his table, unless in comparing it with the females he noted that the basal half was not scabrous, as in the female. This is also the only species having the third and fourth antennal joints equal in length. It is through the kindness of Mr. W. S. Fisher, who made several visits to the National Museum, that I am able to clear up the doubtful points about this species.

**A. subvittatus** Casey.

*A. subvittata* Casey, Ann. N. Y. Acad., 1891, Vol. VI, p. 37.

Piceous black, moderately robust, rather convex. Elytra pale luteo-testaceous, with a broad common sutural and narrow submarginal vitta of piceous-black, the vittæ generally feebly marked, sometimes evanescent. Legs and antennæ piceo-testaceous. Head finely, densely punctate, finely canaliculate between the antennæ, the latter three fourths as long as body, third joint distinctly longer than fourth, but much shorter than fifth. Prothorax slightly wider than head, a little wider than long, apex slightly narrower than base, both feebly arcuate, sides strongly, obtusely tuberculate at middle, disk finely, densely punctate. Elytral pubescence extremely short and sparse, consisting of very minute erect setæ borne from punctures; base not more than one third wider than prothorax, about two and one third times longer than wide, sides distinctly convergent from base to apex; disk very coarsely and sparsely punctate toward base, becoming finer toward apex and along suture. Length 9.3-11.0 mm.

Colorado (?)

The five specimens in Casey's collection and one in the Leng collection are without definite locality. However as the material in the Casey collection is from the Levette cabinet, he believes in all probabilities the specimens were taken in or near above region. The beetles seem to be all males. This species resembles *A. nigrolineatus* Van Dyke more closely than any others, but may be readily sep-

arated by being smaller, less robust, having different colored antennæ and legs, a proportionally much longer elytra with a less definite color pattern, and also several other minor differences.

**A. nigrolineatus** Van Dyke.

*A. nigrolineatus* Van Dyke, Jour. N. Y. Ent. Soc., 1917, Vol. XXV, p. 36.

Quite robust, somewhat convex, piceous black except elytra which are yellow with basilar margin, a moderately broad common sutural stripe, another, narrower, stripe extending from humeri to apex and joining with the sutural, and a narrow marginal bead of deep black, and the abdominal segments which have a reddish cast. Head and pronotum covered with a fine, sparse, and yet distinct, yellowish pubescence. Apices of elytra slightly pubescent, under surface clothed with a longer and denser pubescence. Head rather finely densely punctate in front, more coarsely so between eyes and on occiput, canaliculate between antennæ. Antennæ five-sevenths as long as body, first joint large, longer than second and third together, third slightly longer than fourth. Prothorax two fifths wider than head, wider than long, base slightly wider than apex, about as wide as head, apex feebly arcuate, base slightly lobed at middle, sides strongly, obtusely tuberculate at middle, disc coarsely and confluent punctured, sides more finely so. Entire surface with a granu-lose and opaque appearance, with a shallow fovea at middle. Elytral disc very coarsely, but not closely, punctured from base to middle, thence more finely punctured to apex. Length 14 mm.

Mt. Jefferson, Oregon, July 20 (J. C. Bridwell).

The type, a unique male, is in the collection of Dr. Van Dyke. It was collected in the subalpine region of Mt. Jefferson and probably ranges throughout the true fir forest belt of the Southern Cascades.

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## THE GENERA OF HYDRIOMENINÆ OF THE UNITED STATES (LEP.).

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Our knowledge of the Geometridæ has been much increased since Hulst's paper in the Trans. Am. Ent. Soc., and general ideas of the relative values of the characters he uses are somewhat changed. The following paper is an attempt at a somewhat improved alinement, as well as at a more workable key to the genera, which should avoid the errors which more recent workers have discovered in his tables.